

A New Species of *Montastrea* (Cnidaria, Scleractinia) from the Philippines¹

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ABSTRACT: A new species of the scleractinian coral genus *Montastrea* de Blainville, 1830 was discovered in the Philippines and has been given the name *Montastrea multipunctata*. This species may have been previously overlooked due to its striking resemblance to a co-occurring zoanthid. *Montastrea multipunctata* is unusual because in situ, sediment accumulation often partially covers the corallum, especially in the area between the polyps. The features of *M. multipunctata* coralla are modified by a polychaete worm that resides within them, a relationship found in several other faviid species. Although *M. multipunctata* shares some characteristics with other *Montastrea* species, it is clearly differentiated on the basis of growth form, polyp shape, and corallite morphology, especially the pointed septal dentations of the primary septa, which are usually highly exsert over the theca.

AN UNUSUAL NEW SPECIES of *Montastrea* was discovered in the Philippines. Colonies are commonly found in shallow water growing on carbonate rock and are partially covered with sand and silt. This habit, combined with the living coral's extraordinary resemblance to a co-occurring zoanthid, may explain why it was not collected previously. A description of the living coral and its skeleton follows a brief discussion of the state of the genus *Montastrea* and its occurrence in the Philippines.

The most recent revision of Pacific *Montastrea* grouped over 20 nominal species into 4 species: *M. curta*, *M. annuligera*, *M. magnistellata*, and *M. valenciennesi* (Veron, Pichon, and Wijsman-Best 1977). This classification has been widely accepted, except for the generic status of the latter species, which some workers would like to retain in the genus *Favia*. The question of the generic status of this species will not be resolved without further extensive study. Therefore, I will refer to this coral as *M. valenciennesi* simply as a convenience, without implying agreement

with the Veron, Pichon, and Wijsman-Best (1977) revision on this point.

Montastrea valenciennesi was first reported from the Philippines (as *Favia*) by Faustino (1927) and later described in detail by Nemenzo (1959). The genus *Montastrea* was first reported from the Philippines by Pichon (1977), who noted both *M. curta* and *M. magnistellata*. Complete descriptions of these two species were subsequently provided by Nemenzo and Hodgson (1983). *Montastrea annuligera* is uncommon in the Indo-Pacific and apparently rare in the Philippines. No specimens have been collected so far; however, P. Aliño of the University of the Philippines reports having seen several colonies near Bolinao, Luzon (personal communication).

MATERIAL STUDIED

SYNTYPES: 783, 786, 787, 788; Tambuli Reef, Mactan Island, Cebu, Philippines; 6 m; 1982 (Hodgson). Deposited at the Marine Sciences Center, University of the Philippines, Dili-man, Quezón City, Philippines.

ADDITIONAL SAMPLES: 776; Tambuli Reef, Mactan Island, Cebu, Philippines; 6 m; 1981 (Hodgson).³ 777; same location; 6 m; 1981

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³ This specimen was lost in the mail.

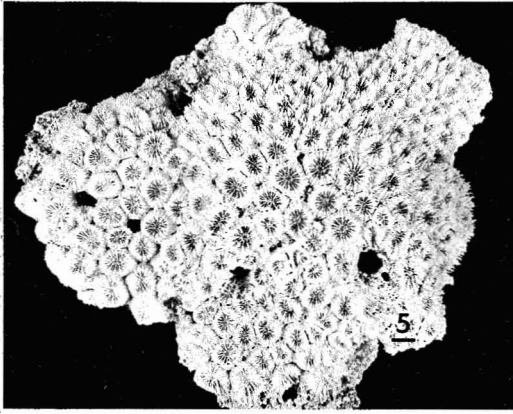


FIGURE 1. Corallum of *Montastrea multipunctata* (no. 787).

(Ross). 778, 779, 780, 784, 785; same location; 6 m; 1982 (Hodgson).

Additional colonies were studied and photographed in the field.

DESCRIPTION

Montastrea multipunctata, sp. n.

Colonies are encrusting (Figure 1); the largest so far observed was 10 cm in diameter. The surface is flattened, irregular, conforming to the substrate. Corallites are mostly subcircular and plocoid, although some portions may be polygonal (usually pentagonal) and subcerooid (Figure 2A, B). In addition, subfasciculate growth is sometimes present at the

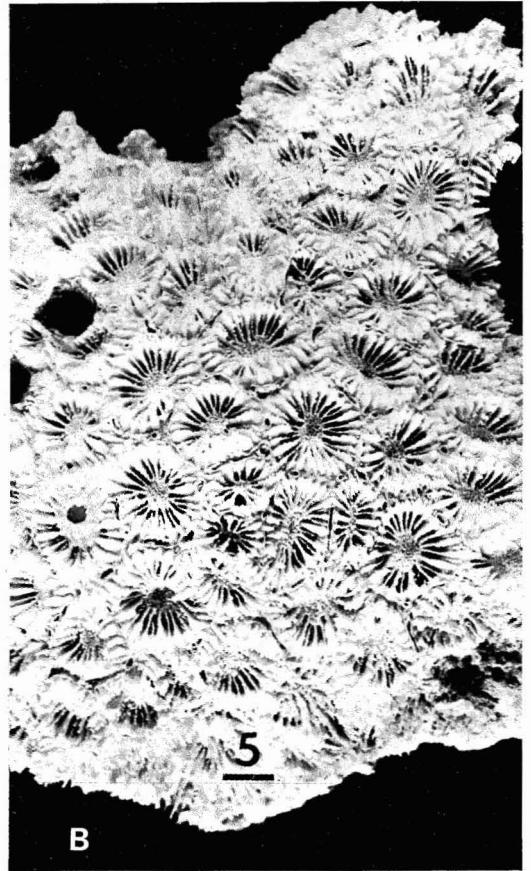
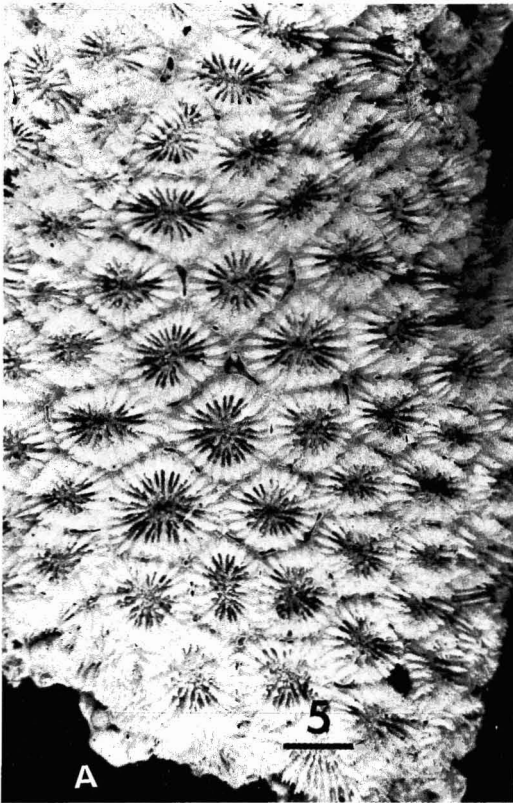


FIGURE 2. A, corallum of *Montastrea multipunctata* (no. 786); B, corallum of *M. multipunctata* (no. 783).

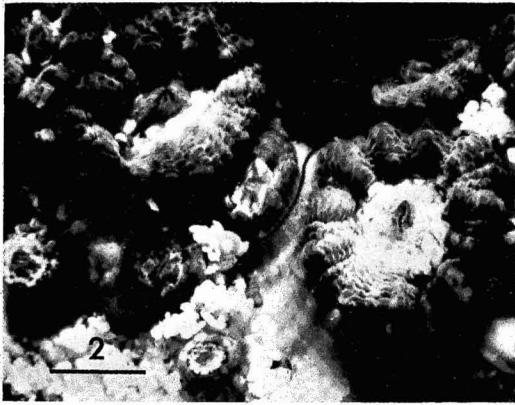


FIGURE 3. Edge zone of living *Montastrea multipunctata* colony showing new corallite buds.

growing edge. Corallites are 3–9 mm in diameter and may be flush or exsert (<3 mm). When exsert, they are in the form of truncate cones. Calices are 2–6 mm in diameter. Budding is completely extratentacular (Figure 3). The wall is septothecal.

Septa (36–48 in number) are in 3–4 very regular orders. Primaries (10–12) are thickened (<0.5 mm) over the wall and gradually become thinner towards the columella; they carry a wide variety of dentations. The primary septa nearly always carry 1 or 2 vertical, pointed teeth exsert 1–2 mm above the wall. To the naked eye these teeth appear sharply pointed, but under the microscope they are revealed to be somewhat blunt-tipped (Figure 4). Most commonly there are 2–4 more lobulate dentations extending subvertically from the upper septal margin, which is often horizontal (<1 mm wide). From there, the primary septa descend into the calice, and may carry 1–3 more teeth which project in parallel and at an oblique, superiointernal angle. Second-order septa (12) are thinner, shorter, less exsert, and descend less steeply into the calice than the primaries, but carry more dentations. Like the primaries, second-order septa usually have 1 pointed, vertical tooth above the wall; they carry 5–7 more dentations projecting in parallel and at a superiointernal angle from the septal edge, before reaching the columella. Both first- and second-order septa usually reach the columella as separate entities and rarely anastomose. Third-order septa (12) are

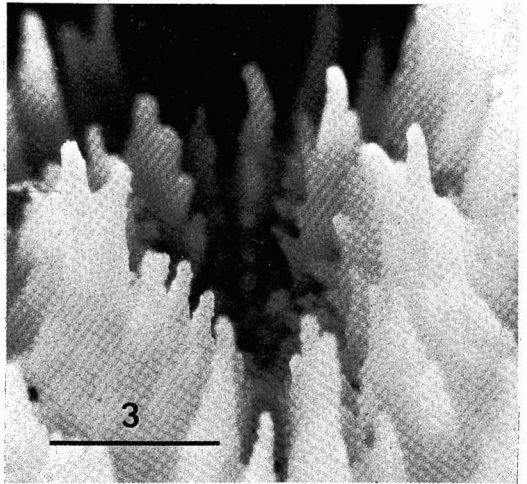


FIGURE 4. Detail of exsert septal dentations, *Montastrea multipunctata*.

never more than a thin ridge along the inner wall. They may carry several short dentations. Fourth-order septa (12) are present occasionally, but are very reduced and nondentate. All septa and septal dentations are abundantly granulate.

Septocostae are in 3 orders corresponding to the septa; they are nondentate but lightly granulate. First-order septocostae are the widest (<0.5 mm); second-order septocostae are thinner, but are equally raised out from the wall, leaving the third-order septocostae in the intervening valleys. The septocostae rarely extend out onto the exotheca as costae, but if so, they are usually not continuous with those of adjacent corallites. The columella is composed of thickened trabeculae, some twisted, some forming vertical pinnacles. It is usually well developed, especially in large corallites (Figure 5).

The intercalicinal furrows between all corallites are inscribed with discontinuous, epithecal gaps and holes in the exotheca, similar to those found in *Montastrea valenciennesi*, *Leptastrea inaequalis*, and other species (Rosen 1968). Upon examination of live specimens under the dissecting microscope, many polychaete worms of a single species were observed moving in and out of surface openings of an intercalicinal tube system. This network of interconnecting tubes is

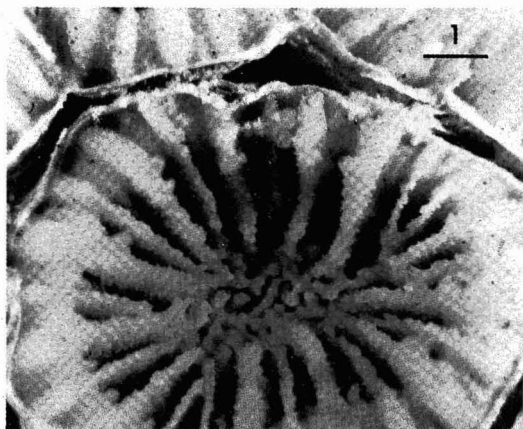


FIGURE 5. *Montastrea multipunctata* calice; note surrounding polychaete tube.

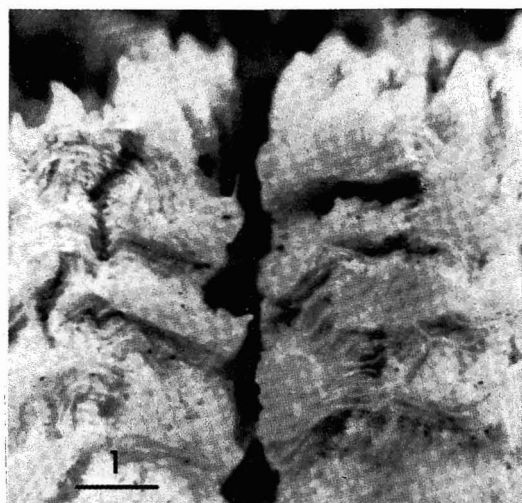


FIGURE 6. Lateral view of *Montastrea multipunctata* corallum split in half to reveal multilevel polychaete tubes (no. 788).

exposed completely when a colony is cracked open (Figure 6). Apparently, as the coral grows upward, the old worm tubes are sealed off and new ones are made above and parallel to them. In this way, the worms can live in channels close to the surface where they appear to feed. It is likely that the worms cause the tube system to be formed, perhaps by irritating the coral tissue. The tubes appear to be epithelial in origin, as noted by Veron, Pichon, and Wijsman-Best (1977).

It should be noted that all *Montastrea multipunctata* colonies observed so far in nature have had abundant accumulations of sand and silt between their polyps (Figure 7A, B). When this accumulation is brushed away, the wide, smooth (nonciliated), coenosarc is revealed (Figure 8A, B). Apparently, the nonciliated coenosarc and flattened, short polyps with their short tentacles are inefficient in cleaning the coenosteum of silt buildup. Casual experiments were carried out by pouring handfuls of sand on live colonies in situ. The polyps cleaned themselves in less than 1 hr, but the sand deposited between the polyps remained after several hours. It is possible that under natural conditions, sand accumulation may render the coenosteum more susceptible to invasion by the polychaetes by providing them with a refuge.

The live polyps exhibit a wide range of color morphs, including transparent, gray, green, pink, and orange sometimes with a green

peristome. The most common color morph has gray polyps and a chocolate-brown coenosarc.

Despite intensive searching, *Montastrea multipunctata* has been observed only in one biotope. In short, this biotope includes a hard carbonate substrate covered with some loose shifting sand in 4–8 m of water. This depth range seems to be very specific. A more detailed description of this biotope is given by Hodgson and Ross (1981).

AFFINITIES

When viewed from a distance, the polyps of *Montastrea multipunctata* resemble those of *Blastomussa merleti* (Figure 9A, B). The polyps of both species have a short body column so that the oral disk lies just above the corallites even when the polyp is fully expanded. In this state of expansion, the short tentacles extend out to the sides in the plane of the oral disk, often overlapping with adjacent polyps. In contrast, other species of *Montastrea* have taller, more fleshy polyps with tentacles that extend subvertically when the polyps are expanded (e.g., see figs. 273 and 283, Veron, Pichon, and Wijsman-Best 1977).

Montastrea multipunctata is often found

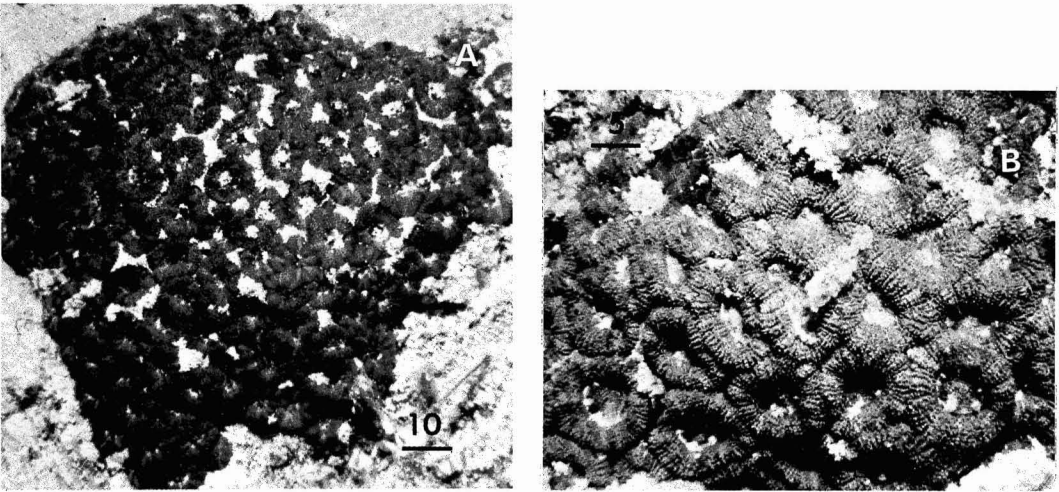


FIGURE 7. A, living colony of *Montastrea multipunctata* in situ (no. 787); B, *M. multipunctata* colony, daytime in situ; note the natural accumulation of sediment between the retracted polyps and the rough texture of the polyp epidermis (no. 786).

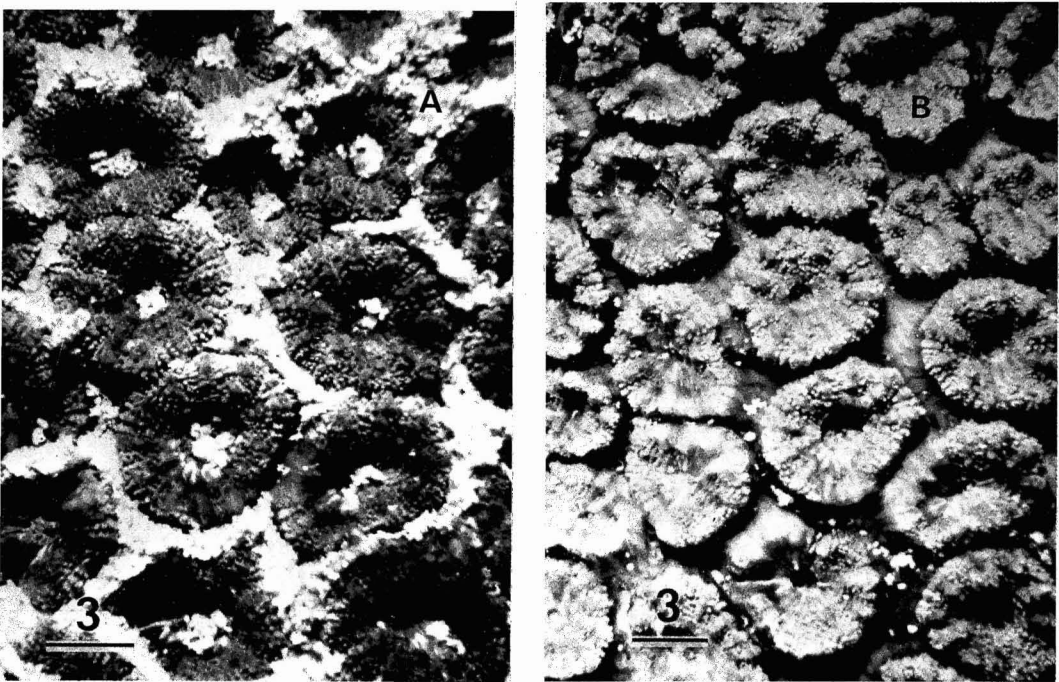


FIGURE 8. A, *Montastrea multipunctata* colony with natural silt accumulation; B, portion of same colony with sediment brushed away to reveal a smooth coenosarc (no. 783).

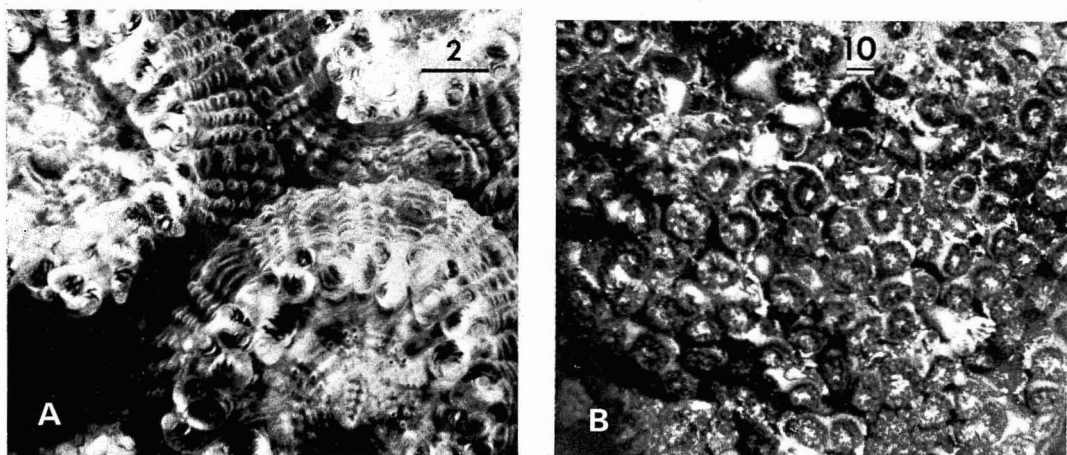


FIGURE 9. A, *Montastrea multipunctata* polyps, half-expanded; B, *Blastomussa merleti*, living colony, daytime.

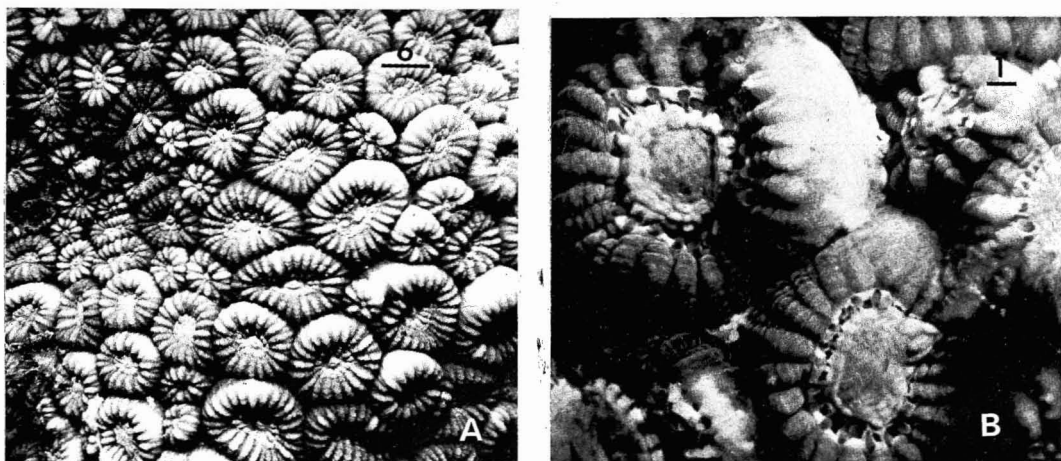


FIGURE 10. A, *Montastrea valenciennesi*, living colony in situ, daytime; same biotope with *M. multipunctata*; B, *M. valenciennesi* with polyps retracted, daytime.

living near beds of a common colonial zoanthid, *Palythoa* sp. The polyps of both species are strikingly similar in color, size, and shape. Both are often partially buried in the sand, with only the polyps protruding. Each can easily be mistaken for the other until the sand has been brushed away. This similarity may explain why *M. multipunctata* has escaped previous notice, despite its relative abundance in shallow water.

Montastrea multipunctata, like *M. annuligera*, shows some affinities with *Leptastrea inaequalis* Klunzinger (*L. bottae* Nemenzo 1959). The size of the corallites, development

of the theca, and intercalicinal groove system are similar in both species. However, *L. inaequalis* is present in greater abundance than *M. multipunctata* within the same biotope. It is easily distinguished from the latter species in the field by color differences and by the irregular exsertion of its primary septa, which are visible through the transparent tissue.

Montastrea multipunctata shares some characteristics with *M. annuligera* and *M. valenciennesi*. Fortunately, *M. valenciennesi* is common in the biotope where *M. multipunctata* is found, facilitating in situ comparison (Figure 10A, B). The two species are readily

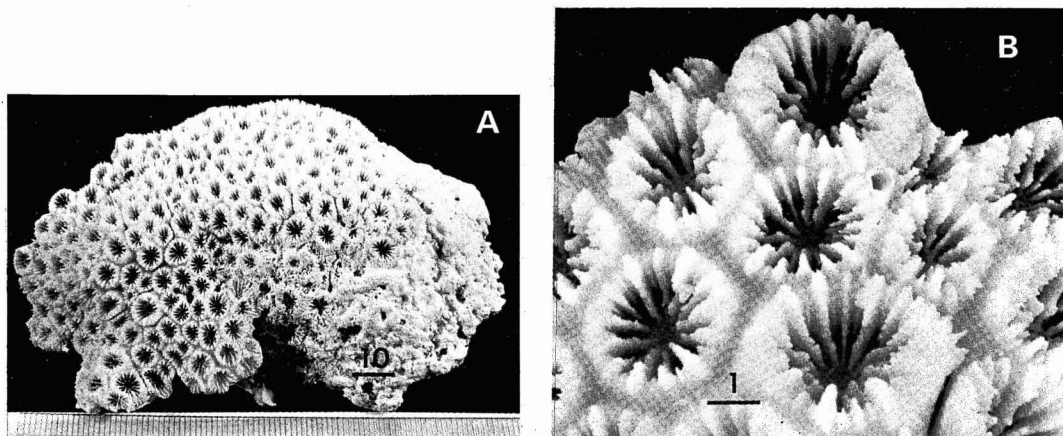


FIGURE 11. A, *Montastrea annuligera* (AIMS); B, corallites of *M. annuligera* (AIMS). Note the well-developed paliform lobes.

differentiated in the field based on the different polyp morphologies previously noted and different color patterns. Although *M. valenciennesi* occurs in various colors, the form common in this biotope is transparent (white) with brown patches. *Montastrea annuligera* and *M. multipunctata* have been differentiated on the basis of skeletal differences because a live colony of *M. annuligera* was not available for examination. Coralla of *M. annuligera* were examined from the collections of the Bernice P. Bishop Museum, Honolulu, and the Australian Institute of Marine Science, Townsville. In general, the coralla of *M. annuligera* (Figure 11A) and *M. valenciennesi* are much more densely calcified and therefore heavier than those of *M. multipunctata* collected from the same depth range. The growth form of both *M. annuligera* and *M. valenciennesi* may be encrusting, but most colonies tend toward a massive growth form. In contrast, *M. multipunctata* colonies are always encrusting and may even appear to be growing directly out of the underlying rock substrate because they fit so closely to the surface.

The diameter of *Montastrea multipunctata* corallites shows a wide range of variation, but on the average they are larger (3–9 mm) than those of *M. annuligera* (3–4 mm) and smaller than those of *M. valenciennesi* (8–15 mm). The number of corallites per 9 cm² was compared between 10 colonies each of *M. annuligera* and *M. valenciennesi* collected from

the same depth range (After Wijsman-Best 1977). *Montastrea annuligera* had a range of 24–31 corallites ($\bar{x} = 27$), while *M. multipunctata* had a range of 16–27 corallites ($\bar{x} = 21$).

The crown of paliform lobes characteristic of both *Montastrea annuligera* (Figure 11B) and *M. valenciennesi* is absent in *M. multipunctata*. Instead, a series of spinulate dentations project internally until the lower ones reach the columella. Since the septa of *M. multipunctata* descend into the calice at a lower slope than those of *M. annuligera*, the calices of the former have a shallower appearance. These characteristics, along with the extraordinary development of septal dentations over the theca, clearly separate this species from all others.

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